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A Graph-Theoretic Characterization Theorem for Multiplicative Fragment of Non-Commutative Linear Logic (Extended Abstract)

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Abstract

It is well-known that every proof net of a non-commutative version of MLL (Multiplicative fragment of Commutative Linear Logic) can be drawn as a plane Danos-Regnier graph (drawing) satisfying the switching condition of Danos-Regnier [3]. In this paper, we study the reverse direction; we introduce a system MNCLL logically equivalent to the multiplicative fragment of Cyclic Linear Logic introduced by Yetter [9], and show that any plane Danos-Regnier graph drawing satisfying the switching condition represents a unique non-commutative proof net (i.e., a proof net of MNCLL) modulo cyclic shifts. In the course of proving this, we also give the characterization of the non-commutative proof nets by means of the notion of strong planity, as well as the notion of a certain long-trip condition, called the stack-condition, of a Danos-Regnier graph, the latter of which is related to Abrusci balanced long-trip condition [2].

1 The first author was partially supported by a Grand-in-Aid for Encouragement of Young Scientists No. 06740175 of the Ministry of Education, Science and Culture

2 The second author was supported by Grants-in-Aid for Scientific Research of the Ministry

10.1016/S1571-0661(05)82518-6